Using the Reverse Order Technique with Non-Native Speakers or Through an Interpreter

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Abstract

We examined whether the reverse order technique can be implemented when people speak through an interpreter. A total of 40 Chinese, 40 Korean and 30 Hispanic participants were interviewed in English or in their own native language through an interpreter. Interviewees were asked to tell the truth or lie about a secret meeting they viewed. They were asked to recall what they saw in chronological order and then in reverse order. The reverse order technique revealed two cues to deceit (detail and commissions) when an interpreter was present, whereas no cues to deceit emerged when interviewees spoke in English. This suggests that the reverse order technique can be used with an interpreter but possibly not with non-native speakers. Perhaps the combined task of speaking in a non-native language and reporting in reverse order is mentally taxing for liars and truth tellers, thus making differences between them unlikely to emerge.

Keywords: reverse order technique; non-native speakers; interpreters; detecting deception

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In recent years researchers have started to design interview protocols aimed at eliciting and enhancing cues to deceit (Vrij & Granhag, 2012). Examples of such interview protocols include The Strategic Use of Evidence (Granhag & Hartwig, 2015; Hartwig, Granhag, & Luke, 2014) and cognitive lie detection (Vrij, 2014, 2015; Vrij, Fisher, & Blank, 2015). The present experiment focuses on one particular cognitive lie detection technique: asking interviewees to report an event in reverse order. The present experiment advances knowledge about the reverse order technique by examining whether this technique can also be successfully implemented when interviewees speak in a non-native language (English) or through an interpreter. This is an important question given interviews in which interviewers and interviewees do not share the same native language happens more so now than any time in history (Mulayim, Lai, & Norma, 2014).

The reverse order technique is part of the Cognitive Interview, a memory-enhancement interview protocol designed for interviewing cooperative witnesses (Fisher & Geiselman, 1992). The technique asks interviewees to report an event in reverse chronological time order. This reverse order request is typically made after the interviewee has given an account in chronological order and is aimed at eliciting additional information (Fisher & Geiselman, 1992). Through this reverse order instruction, interviewees are encouraged to think back at the event from a different perspective, which often results in the reporting of information that has not been previously reported.

Recently, the reverse order technique has been successfully introduced as a tool to detect deceit in suspect interviews. In two experiments observers were better at distinguishing between truth tellers and liars when stories were told in reverse order than in chronological order (Evans, Michael, Meissner, & Brandon, 2013; Vrij et al., 2008). Whilst neither of these two studies examined whether the reverse order technique resulted in commissions

(additional detail), a study by Shaw, Vrij, Leal, and Mann (2014) did. In that experiment participants (truth tellers and liars) were first invited to recall a 'secret meeting' they attended in chronological order and then, again, in reverse order. Reverse order recall resulted in commissions, particularly from truth tellers.

It may be that liars lack the imagination needed to convey additional detail or that they may be reluctant to provide additional detail out of fear that (i) this may provide leads to investigators to check or (ii) they will forget to report this additional information when asked to report it again. Additionally, liars may refrain from providing additional information because they are inclined to be consistent in repeated interviews. Consistency is one of the most frequently reported subjective cues to deceit (Strömwall & Granhag, 2003; Strömwall, Granhag, & Hartwig, 2004; Strömwall, Granhag, & Jonsson, 2003). The belief, held by both laypersons and professionals, is that consistency within an account is a sign of truthfulness and inconsistency is a sign of lying (Akehurst, Köhnken, Vrij, & Bull, 1996; Greuel, 1992; Strömwall, Granhag, & Hartwig, 2004; The Global Deception Team, 2006). There is no evidence that this belief is accurate. Liars may fear that the additional detail they provide may be perceived as a sign of inconsistency and thus as a sign of lying. Truth tellers, on the other hand, are less concerned with consistency than liars. Truth tellers typically take their credibility for granted (DePaulo et al., 2003; Gilovitch, Savitsky, & Medvec, 1998) and have no reason to believe that interviewers will doubt them. They are therefore not concerned with conveying their honesty (Kassin, 2005; Kassin, Appleby, & Torkildson-Perillo, 2010). The result is that liars can be more consistent than truth tellers, as predicted in the "repeat versus reconstruct hypothesis" (Granhag & Strömwall, 1999, 2001; Granhag, Strömwall, & Jonsson, 2003). Liars try to repeat what they have said before, whereas truth tellers try to reconstruct the event again. Reconstructing an event twice from memory often leads to inconsistencies (Loftus, 2003; Vredeveldt, van Koppen, & Granhag, 2014).

To date the reverse order deception research has only been carried out with interviewees who speak in their native language. (Evans et al. [2013] examined reverse order and non-native speakers conditions, but not in combination and not with interpreters.) However, in today's society with widespread travel, it is the case that investigators and interviewees do not share the same native language. This may result in suspects speaking in the language of the interviewer, which is for them a non-native language, or suspects speaking in their native language through an interpreter. In the present experiment Chinese, Korean and Hispanic participants took part who either spoke in English (for them a non-native language) or in their native language through an interpreter. Speaking in a non-native language, compared to a native language, is cognitively demanding (Evans, Michael, Meissner, & Brandon, 2013) and understanding of and speaking in a non-native language consumes more working memory resources (Service, Simola, Metsaenheimo, & Maury, 2002). Recalling a story in reverse order is also cognitively demanding because it runs counter to the natural experience of recalling events in sequential order, and it disrupts reconstructing events from a schema (Gilbert & Fisher, 2006). It could therefore be that the combination of the two (recalling an event in reverse order in a non-native language) could lead to a cognitive overload, which could obscure the differences between truth tellers and liars in reporting commissions. Having an interpreter present may reduce the cognitive load induced by speaking in a non-native language as interviewees can communicate in their own language. This may free up cognitive resources, which will enable interviewees to include commissions, which is most likely to happen in truth tellers for reasons outlined before. We therefore predicted that the reverse order instruction will result in more commissions from truth tellers than from liars, particularly when participants can speak in their own language through an interpreter (Hypothesis 1).

Apart from commissions, we examined 'total detail' (all the information about what the participants saw or heard in the video). We have different predictions for the Chronological Order and Reverse Order questions. Deception research has demonstrated that truth tellers typically give more detail than liars (DePaulo et al., 2003; Masip, Sporer, Garrido, & Herrero, 2005; Vrij, 2008), and this happens when truth tellers and liars talk in their native language, a non-native language or through an interpreter (Ewens, Vrij, Leal, Mann, Jo, & Fisher, 2014). Some of the reasons as to why liars may provide fewer commissions may also explain why liars are less detailed in general. Liars may lack the imagination or be reluctant to provide detail. We thus predicted that, when they are asked to report the event in chronological order, truth tellers will be more detailed than liars in the non-native language (English) condition as well as in the interpreter condition (Hypothesis 2).

Since (i) answering a question in reverse order and (ii) speaking in a non-native language are both mentally taxing, we can assume that truth tellers and liars will both struggle when having to report their stories in reverse order in a non-native language. This may negate the possibility that differences in detail will emerge between truth tellers and liars. We thus predicted that, when they are asked to report the event in reverse order, truth tellers will be more detailed than liars, particularly in the interpreter condition (Hypothesis 3).

In their recent overview of differences between truth tellers and liars in consistency, Vredeveldt et al. (2014) raised a question which, in their view, is important and not yet addressed: What is the impact of imposing cognitive load on consistency during an interview? We investigated this in the present experiment and examined the extent to which interviewees will report the same details in their answers to the chronological and reverse order questions (repetitions). Repetitions, like commissions, are part of consistency. More repetitions and fewer commissions lead to higher consistency.[1] Liars are concerned with

consistency, which may be a reason as to why they are reluctant to provide additional information, see above. This concern to be consistent may also make them focus on repeating what they have said before. If liars would repeat themselves to the same extent or more than truth tellers, then this would be in alignment with previous consistency deception research, which found that liars are typically either equally consistent or more consistent than truth tellers (see Vredeveldt et al. [2014] for an overview of that research). In addition, for those who speak in a non-native language, differences between truth tellers and liars in repetitions may not emerge due to the combined difficulty of speaking in that language and having to do so in reverse order. It is therefore unlikely that truth tellers and liars will differ much from each other in terms of repeating themselves when answering the reverse order question, but it may be that participants in the English condition will repeat themselves less than those in the interpreter condition due to the difficulty they face when speaking in that non-native language (Hypothesis 4).

Method

Participants

A total of 110 participants (36 males and 74 females) took part in the study. They were of Chinese (n = 40), Korean (n = 40) and Hispanic (n = 30) backgrounds of whom 20 Chinese, 20 Korean and 20 Hispanic participants were allocated to the interpreter condition. Ages ranged from 18-31 years with an average age of 22.75 years (SD = 2.51). Participation took place in three different universities in the United Kingdom, Republic of Korea and USA. The Chinese sample was collected in the UK, the Korean sample in Korea and the Hispanic sample in the USA. Participants at all locations consisted of university students and staff. Although participants were randomly allocated to the English and interpreter conditions, age differed between conditions, $F(1, 108) = 13.23$, $p < .000$, $eta^2 = .11$, with the participants in the English condition (M = 21.84, SD = 2.43, 95% CI [20.16, 23.52]) being somewhat

younger than those in the interpreter condition (*M* = 23.50, *SD* = 2.35, 95% CI [21.66, 25.34], but the age difference between the two groups (M = 1.66 years) was small. Also, when age was used as a covariate in all proceeding analyses it did not change the findings reported in the Results section (age had no effect on any of the dependent variables, all *F's* < 2.85, all *p's* > .09).

Grasp of English. Three coders rated English proficiency of the participants in the English condition by listening to the interviews and using a scale from Embassy English, an English language training scheme. The scale consists of five categories: [1] Beginner (those who know a few English words i.e., hello, taxi, football), [2] Elementary (those who can communicate in a basic way/can make simple sentences, reply to questions on a range of personal and common subjects, talk about likes and dislikes, family and routines), [3] Pre-Intermediate (those with a good basic ability to communicate and understand many subjects and give opinions; grammar includes understanding of adjectives, adverbs, comparatives and basic prepositions), [4] Intermediate (those who have the grammar to talk about a wide number of subjects, have some understanding of tone and style, can confidently make sentences, question forms and clauses), and [5] Upper-Intermediate (those who can talk fluently and almost completely accurately). A reliability analysis revealed that the agreement between coders was very good (Cronbach's $\alpha = .87$). When there was a disagreement between the three coders, two coders gave the same ratings and that a third coder was an outlier. In such situations, the classification made by the two coders who agreed was used. The interviewees were classified as Beginner 0%, Elementary 32%, Pre-Intermediate 42% and Intermediate 26% and Upper-Intermediate 0%. The fact that none of the participants spoke English at Beginner's level or at Upper-Intermediate level represents real life. Those who speak English at Beginner's level cannot be interviewed without an interpreter because their English is not good enough to convey information in English. Those who speak English

at Upper-intermediate level probably do not even consider using an interpreter during their interviews (and may not be offered one). It is thus the middle groups for whom the choice to use an interpreter is most valid and, consequently, for whom the comparison between being interviewed with or without an interpreter becomes most relevant.

Procedure

Participants were invited to play the role of a security guard at an intelligence agency and then to attend an interview. On arrival to the corresponding university, participants were greeted by members of the research team. They were informed that they were going to play the role of a security officer and that they would be viewing video footage of a secret meeting. The videos were dubbed over into the appropriate language and participants viewed the video in their native language. All participants completed a pre-interview questionnaire before watching the video, in which they were asked to what extent they were motivated to perform well in the interview on a 5 point scale (1 = not at all motivated to 5 = very motivated). All forms were translated and completed in the first language of each participant **The meeting.** The purpose of the secret meeting was to vote on a suitable location to plant a spy device. All participants were told to watch the footage and that it was essential that they remembered as much detail as they could. The meeting contained three members, one of which did all the talking and led the meeting. He spoke firstly about the spy device and its technical features. He then introduced the possible locations to host the device, which included the name of the building, location, where specifically the device would be planted, and why it was a suitable location. The leading member discussed two locations in full but for the third location he just mentioned the name of the building. He said that he had to leave and could therefore not discuss further details. This resulted in all members taking a vote on which of the two locations was best to hide the device. The first location was always chosen as the selected site. Three variations of the video were used for counterbalancing. This was

achieved by switching the order in which the three possible locations were presented, meaning that the selected site changed. Additionally, the device was physically different in all three videos. The technical features, however, stayed the same. Once the video had finished the participants were randomly allocated to the truth telling (n = 57) or lying (n = 53) condition.

Truth tellers were informed that the footage they had just watched had disappeared and that the agency had launched an investigation. The agency believed they had a mole working for them and it was of the utmost importance that the investigators knew as much detail about the video as they could. Truth tellers were told to fully cooperate with the investigators, to be completely truthful, and to answer the questions to the best of their knowledge.

Liars were informed that the footage they had just viewed had disappeared. The agency had launched an investigation and needed to know in as much detail as possible what happened in the video. Liars were told it was now their responsibility to recall that information in an interview. The intelligence agency believed they have a mole working for them, which could be the investigators the liars were going to talk to. It was thus important not to disclose vital information to them. Liars were told the investigators knew the device would be placed somewhere, but they did not know where. So, above all, they must *not* reveal the location that was selected to hide the spy device and their objective was to mislead the investigators. Liars were instructed, when asked to describe the location that was *selected*, to provide some false, decoy information. They were told to use the third location as the location that was selected to plant the device. Since no information other than the name of the building was provided in the meeting about this third location, liars needed to invent these details. In total, they needed to make up three bits of information. First, the location of the building in which the device would be planted. Second, specifically where the device would

be planted within the building, and third a reason why this location was suitable to plant a spy device. Liars were also told they needed to mislead the investigators about the device. The investigators knew something about the device but they did not have all the details, and it is not clear what they knew. Because of this, liars needed to provide *some truthful* and *some false* information about the device, which would help them to appear cooperative without having to tell the investigators everything. It was up to the participants to decide how much truthful and false information they would give. Both liars and truth tellers were given as much time as they needed before the interview to invent their stories and/or think about what they had seen in the meeting. No-one took more than ten minutes to prepare a story.

All participants were told that they must convince the investigators that they were telling them the truth, and if they did they would receive £7 (or an equivalent amount in Korea and the US). They were further told that if they could not convince the investigators, they would be asked to write a report about the meeting.

The study included two conditions. In the interpreter condition 20 Chinese, 20 Korean and 20 Hispanic participants spoke through an interpreter. In total, six interpreters were used in the study: Chinese (n = 2), Korean (n = 2) and Hispanic (n = 2), two of them were professional interpreters, the other four had fluent bilingual skills (native language and English). Using a mixture of professional and non-professional interviewers represents real life, at least in UK police investigations (Wakefield, Kebbell, Moston, & Westera, 2014). Interpreters were requested to speak in the first person and to give a complete account of the interviewee's response [to the best of their ability] after the interviewee had finished answering each question. They were encouraged to take notes when the interviewee spoke. The interpreters were asked to rate their level of proficiency in their second language (English) on a scale ranging from [0] none to [10] perfect. They rated their speaking proficiency and their understanding of spoken language. All interpreters rated themselves as a

score of 8 or above for both speaking and understanding of the spoken language. Thus, interpreters reported to have a very good understanding of the language they were interpreting.

The other condition did not have an interpreter present. This English condition consisted of 20 Chinese, 20 Korean and 10 Hispanic native speakers who were interviewed in English (and answered in English). In the English condition, all participants had a level of English, which ensured they would be able to get by in the interview (see below), as judged by the RAs. The non-native languages were equally distributed across the English and interpreter conditions.

Participants were brought to the interview room and introduced to the interviewer and, if present, the interpreter. Both interviewer and interpreter were blind to the veracity of the participant. Two female interviewers were used for all interviews. Both were British and spoke English during the interviews. The interview contained two general questions. Question 1 (Chronological Order) asked participants to recall everything they saw in the video starting from the moment the video begun until it finished. Questions 2 (Reverse Order) asked participants to recall everything they saw in the video in reverse chronological order, starting from the moment the video ended to the beginning of the video. The interviews were video and audio recorded and the English speech in the audiotapes was subsequently transcribed.

Coding

All coders were blind to the hypotheses and experimental conditions of the study.

Total Detail, Commissions and Proportion Repetitions. A coder, blind to the experimental conditions and hypotheses, first read the transcript and coded each of the two questions for number of detail. The sentence 'We[1] played[2] two[3] games[4] during which[5] we drank[6] tea[7] and coffee[8]' contains eight details. Total detail included all the information about

what the participants saw or heard in the video. The second question was also coded for commissions (detail added from Chronological Order) and repetitions (detail in Reverse Order that was previously reported in Chronological Order). A second coder coded a random sample of 50 transcripts. Inter-rater reliability between the two coders was excellent for total detail (ICC = .96), commissions (ICC = .91) and repetitions (ICC = .94). In the Results section, we refer to 'proportion repetitions' rather than 'repetitions'. 'Proportion repetitions', is the number of repetitions in Reverse Order divided by number of detail in Chronological Order.

We thus report 'proportion repetitions' and 'number of commissions' as we believe this is what interviewers in real life would be interested in. They would like to know the proportion of information that is repeated (as that gives them an idea of consistency) but also the amount of new information that is given in answer to the reverse order question. Calculating a proportion of commissions will misrepresent what interviewers are looking for. For them every new detail is equally important regardless of what else someone says. If we would calculate proportion commissions (commissions divided by total amount of detail in the reverse order question), it would mean that if two people give the same amount of new information in the reverse order question this would count less (a lower commission proportion) for the person who in the reverse order answer also repeated a lot of information already given in the chronological order question than for the person who repeated him/herself less. We do not find this appropriate.

Results

Motivation

A 2 (Veracity: truth vs lie) X 2 (Interview condition: English vs Interpreter) ANOVA was conducted on the motivation manipulation check. The analysis revealed a significant Interview condition effect, $F(1, 106) = 18.30$, $p < .001$, $eta^2 = .15$, 95% CI [.04, .27]). The

participants in the English condition (M = 3.60, SD = .67, 95% CI [3.41, 3.79]) were significantly less motivated than participants in the Interpreter condition (M = 4.10, SD = .66, 95% CI [3.98, 4.32]). The Veracity main effect, $F(1, 106) = .107$, $p = .745$, $d = 0.03$, 95% CI [-.34, .41]), and Veracity X Interview condition interaction effect, $F(1, 106) = .204$, $p = .652$, $eta^2 = .002$, 95% CI [.00, .04]) were not significant. The grand mean score (M = 3.90, SD = .72 on a 5-point scale) revealed that the participants were motivated to perform well during the interview. When motivation was used as a covariate in all proceeding analyses it did not change the findings reported in the Results section (the effect of motivation had no significant effect on any of the dependent variables, all F's < 1.91, all p's > .17).

Hypotheses Testing

To test the four hypotheses we carried out four 2 (Veracity) X 2 (Interviewer condition) ANOVAs. For the commissions analysis, we included the number of detail in the Chronological Order question as a covariate, as the number of commissions depends on the amount of detail provided in the Chronological Order question: The more detail given in the Chronological Order question the less likely that participants can add new detail. The decision to include the covariate in the analyses had no effect on the data. When the data were analysed without this covariate, the same pattern of results emerged as reported in the text.

To test Hypothesis 1, we conducted a 2 (Veracity) X 2 (Interview Condition) ANCOVA with commission as dependent variable and Chronological detail as a covariate. The analysis yielded a significant Veracity X Interview Condition interaction effect, $F(1, 105) = 4.10$, $p = .048$, $eta^2 = .037$, 95% CI [.00, .13]). The Veracity main effect, $F(1, 105) = .179$, $p = .673$, $d = 0.30$, 95% CI [-.08, .67]), and a The Interview Condition main effect, $F(1, 105) = .235$, $p = .629$, $d = 0.09$, 95% CI [-.28, .47]), were not significant. Table 1 shows that

truth tellers provided significantly more commissions than liars in the interpreter condition but not in the English condition, supporting Hypothesis 1.

Table 1 about here

To test Hypothesis 2, we conducted a 2 (Veracity) X 2 (Interview Condition) ANOVA with Chronological Order detail as dependent variable. This analysis yielded a significant Veracity main effect, $F(1, 106) = 27.282$, $p < .001$, $d = 1.05$, 95% CI [.63, 1.42]). The Interview Condition main effect, $F(1, 106) = .015$, $p = .901$, $d = 0.05$, 95% CI [-.32, .43]), and Veracity X Interview Condition interaction effect, $F(1, 106) = .128$, $p = .721$, $eta^2 = .001$, 95% CI [.00, .04]), were not significant. Truth tellers ($M = 21.79$, $SD = 11.36$, 95% CI [19.17, 24.38]) provided more detail than liars ($M = 11.70$, $SD = 7.84$, 95% CI [9.04, 14.48]). Table 1 shows that this happened in both interview conditions, supporting Hypothesis 2.

To test Hypothesis 3, we conducted a 2 (Veracity) X 2 (Interview Condition) ANOVA with Reverse Order detail as dependent variable. This analysis yielded a significant Veracity main effect, $F(1, 106) = 14.803$, $p < .001$, $d = 0.77$, 95% CI [.37, 1.15]), and a significant Veracity X Interview Condition interaction effect, $F(1, 106) = 4.27$, $p = .041$, $eta^2 = .039$, 95% CI [.00, .13]). The Interview Condition main effect, $F(1, 106) = .106$, $p = .745$, $d = 0.04$, 95% CI [-.33, .42]), was not significant. Table 1 shows that truth tellers provided significantly more details than liars in the interpreter condition but not in the English condition, supporting Hypothesis 3.

To test Hypothesis 4, we conducted a 2 (Veracity) X 2 (Interview Condition) ANOVA with proportion repetitions as dependent variable. The analysis yielded no significant effect (Veracity main effect, $F(1, 106) = .001$, $p = .974$, $d = 0.03$, 95% CI [-.34, .40]); Interview Condition main effect, $F(1, 106) = .047$, $p = .829$, $d = 0.03$, 95% CI [-.34, .41]); Veracity X Interview Condition interaction effect, $F(1, 106) = 1.49$, $p = .224$, $eta^2 =$

.014, 95% CI [.00, .09]). Hypothesis 4, in which it was predicted that more repetitions would occur in the interpreter condition than in the English condition, is not supported. Table 1 shows that in both interview conditions truth tellers and liars did not differ from each other in repeating themselves. Table 1 also shows that the proportion of repetitions was rather low amongst both truth tellers and liars (about 40%).

In sum, the interpreter condition yielded the best results as the reverse order instruction resulted in two cues to deceit (detail and commissions). The English condition yielded no differences between truth tellers and liars in response to the reverse order instruction.

The effect sizes (*d*-scores) showed that in the interpreter condition the difference in detail between truth tellers and liars was equally pronounced in response to the Reverse Order question (d = 1.42, 95% CI [.74, 1.86]) and to the Chronological Order question (d = .96, 95% CI [.61, 1.71]) (large overlap between the d's confidence intervals), whereas for the English condition the difference was most pronounced in the Chronological Order question (d = .89, 95% CI [.28, 1.45] vs d = .30, 95% CI [-.26, .86]). This is a further indication that the reverse order instruction was more successful in the interpreter condition than in the English condition.

Finally, in the interpreter condition, liars provided the same number of repetitions as truth tellers but fewer commissions. Since repetitions lead to consistency and commissions lead to inconsistency this means that in the interpreter condition liars were more consistent than truth tellers. In the English condition no differences in repetitions and commissions emerged between truth tellers and liars, which means that truth tellers and liars were equally consistent in those conditions.

Discussion

In this experiment we examined whether the instruction to report an event in reverse order could be used as a lie detection tool when interviewees (i) speak in a non-native language or (ii) through an interpreter. The results showed that the reverse order technique was used successfully through an interpreter with two cues to deceit (differences in detail and commissions) emerging. The reverse order technique was unsuccessful when used with interviewees who spoke in a non-native language, as no cues to deceit emerged. An explanation for the latter finding is that the combined task of having to speak in a non-native language and to report in reverse order is mentally very taxing for liars as well as truth tellers, making it unlikely that differences between them will emerge.

A debate in the literature continues with regards to whether liars are more or less consistent than truth tellers. Practitioners overwhelmingly believe that liars are less consistent than truth tellers (Strömwall, Granhag, & Hartwig, 2004), and this view is also reported in police manuals (Vrij & Granhag, 2007). However, the 'repeat versus reconstruct' hypothesis gives a good theoretical rationale as to why liars may be more consistent than truth tellers. Liars focus on repeating what they have previously said whereas truth tellers focus on reconstructing the event again from memory, and the latter leads to inconsistencies (Granhag & Strömwall, 1999, 2000; Granhag, Strömwall, & Jonsson, 2003). In this experiment we found that liars were more consistent than truth tellers when they were interviewed through an interpreter and equally consistent as truth tellers when they were interviewed in a second language. This provides some support for the repeat versus reconstruct hypothesis but contradicts practitioners' views that liars are more inconsistent than truth tellers.

Truth tellers and liars did not differ in the two experimental conditions in terms of the repetitions they provided. In fact, the proportion of detail that was repeated between the Chronological Order and Reverse Order questions was rather low, 40%, indicating that the majority of detail (60%) provided in the Chronological Order question response was no

longer provided in the Reverse Order question response. Perhaps liars failed to include more repetitions because the Reverse Order task was too difficult for them to do so (even in the interpreter condition). Truth tellers may have left out information when answering the Reverse Order question due to a lack of motivation. They had given the information just before when answering the Chronological Order question, so why should they bother to say it all again? Indeed, Shaw et al. (2014) found that truth tellers repeated themselves more in the reverse order instruction when they were interviewed by a fresh interviewer who had not heard the chronological order response before than by an interviewer who had heard it all before. In fact, only when they were interviewed by a fresh interviewer did truth tellers repeat themselves more than liars.

In their recent systematic review of the consistency deception literature, Vredeveldt et al. (2014) wondered about the impact of imposing cognitive load on consistency during an interview. This is a wide-ranging question that cannot be answered in a few experiments. In the interpreter condition truth tellers and liars were equally repetitive in response to the reverse order question but truth tellers included more commissions than liars (thus liars were more consistent than truth tellers), whereas in the English condition, no differences occurred between truth tellers and liars in their reverse order responses. This may be due to the task becoming very difficult for both liars and truth tellers. This suggests that if the interview setting becomes too difficult, truth tellers as well as liars may struggle to answer a question, negating possible differences in consistency between them.

Methodological Considerations

A few methodological issues merit attention. We did not counterbalance the order in which the questions were asked and the Reverse Order question was always asked after the Chronological Order question. We had two reasons for this. First, asking the reverse order question after the chronological order question is not only common practice, it is also

recommended. Dando, Ormerod, Wilcock, and Milne (2011) observed that the reverse order technique should only be employed after the chronological account, as the reverse order technique may disrupt the temporal clustering of information stored in memory. Second, it was not our intention to test whether the reverse order technique works per se, rather the aim was to investigate whether the reverse order technique yields differences between truth tellers and liars when they speak in a non-native language or when they speak in their native language through an interpreter.

We acknowledge that having an interpreter present created a confound in the design, by increasing the number of individuals in the room. We do not believe this has affected the results. The interpreter always displayed a neutral demeanour and research has shown that a second interviewer in the room who displayed a neutral demeanour had no effect on eliciting information and cues to deceit (Mann, Vrij, Shaw, Leal, Ewens, Hillman,., . . . & Fisher, 2012). In addition, Driskell, Blickensderfer, and Salas (2013) examined how the introduction of a second interviewer in a police interview setting affected rapport (it is thought that rapport influences the amount of elicited information.) They found no difference in rapport when they compared interviews conducted by one or two interviewers.

We used a mixture of professional and non-professional interpreters, which reflects real life practice. However, it may have had an effect on the quantity and quality of the information translated. Perhaps professional interpreters translate more information and do this with higher accuracy. However, the aim of this experiment was to examine whether the reverse order technique can be used with interpreters and non-native speakers. Since we found that the reverse order technique can be used with interpreters, we do not think that it was problematic that we also used non-professional interpreters in the experiment.

It was not the aim of this article to test whether language proficiency has an effect on deception, because we already know it has (DaSilva & Leach, 2013; Evans et al., 2013).

Replicating this finding implies that we had to recruit many more participants than we did. Level of proficiency could not have affected the findings. We recruited non-native English participants with varying levels of English proficiency -as this reflects real life- and randomly distributed them across both non-native English conditions. Although participants in the interpreter condition did not speak English at all during the interviews, in theory, their English proficiency could have affected the results. Those who speak English may have understood the English questions asked by the interviewers before they were translated into their own language, giving them a little bit more time to think of an answer. Such an advantage could be substantial in real life interviews, where investigators typically ask many questions (Vrij, Leal, Mann, Vernham, & Brankaert, 2015), but not in the present experiment where only two questions were asked.

Practical Application

In recent years researchers have started to design interview protocols aimed at eliciting and enhancing cues to deceit and asking interviewees to report an event in reverse order is an example of such a technique. The present experiment demonstrated that this technique can be successfully implemented when interviewees speak through an interpreter, an important finding given the increasing number of interviews in which interviewer and interviewee do not share the same native language (Mulayim, Lai, & Norma, 2014) and, consequently, interpreters are introduced. However, this experiment has shown that the reverse order technique was not successful with non-native English speakers who spoke in English, suggesting an important restriction in using this technique.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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Table 1. Dependent Variables as a Function of Veracity and Interview Condition

	Truth			Lie						
	M	*SD*	CI	*M*	*SD*	CI	*F*	*P*	*d*	CI
Commissions										
English	5.93	4.28	4.33, 7.53	6.39	3.86	4.66, 8.13	1.16	.287	.11	-.44, .67
Interpreter	7.70	3.98	6.44, 8.84	5.27	2.53	.35, .30	4.30	.043	.75	.20, 1.25
Detail in Chronological order										
English	21.56	11.84	17.37, 25.73	12.22	9.17	7.70, 16.76	9.46	.003	.89	.28, 1.45
Interpreter	22.00	11.10	18.59, 25.39	11.30	6.79	7.91, 14.71	20.28	<.001	.96	.61, 1.71
Detail in Reverse order										
English	14.15	7.69	11.35, 16.94	12.00	6.49	8.98, 15.03	1.12	.296	.30	-.26, .86
Interpreter	17.03	6.87	15.00, 19.02	9.90	3.53	7.91, 11.94	25.62	<.001	1.42	.74, 1.86
Proportion repetitions										
English	.39	.20	.30, .47	.44	.26	.35, .53	.52	.476	.22	-.34, .78
Interpreter	.43	.19	.35, .51	.38	.24	.30, .46	.66	.422	.23	-.26, .75

[1] Consistency can be determined by examining repetitions (details that are mentioned in both statements), omissions (details mentioned in an earlier statement but not in a later statement), commissions (details mentioned in a later statement but not in an earlier statement), and contradictions (details mentioned in one statement that are in conflict which what has been said in another statement). More repetitions and fewer omissions, commissions and contradictions lead to higher consistency. In the present study we focussed on commissions (introduced above) and repetitions. Contradictions did not occur enough in the present study and omissions can be derived from total details and repetitions (the number of omissions in a second statement equals the number of detail in the first statement minus the number of repetitions in the second statement).